Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information for

Comparison of electrochemical performance of $LiNi_{1-x}Co_xO_2$ cathode materials synthesized from coated $(1-x)Ni(OH)_2@xCo(OH)_2$ and doped $Ni_{1-x}Co_x(OH)_2$ precursors

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Rate performance test

The Li/$LiNi_{1-x}Co_xO_2$ (x = 0.04, 0.08, 0.12, 0.16) cells were charged and discharged by applying a constant current density of 20 mA g^{-1} (0.1C) for the initial 5 cycles and then cycled at 0.2C, 0.5C, 1C, 2C, 5C, 0.1C for the subsequent 30 cycles in the voltage range of 2.75-4.3 V at room temperature on a LAND CT-2001A test system (Wuhan).

Fig. S1 shows rate performance of the $LiNi_{1-x}Co_xO_2$ materials synthesized from coated and doped precursors. For the initial 5 cycles at the current density of 0.1C, the $LiNi_{1-x}Co_xO_2$ materials synthesized from coated and doped precursors both have the highest discharge specific capacity at Co content x = 0.08. However, the material with the highest discharge specific capacity becomes $LiNi_{0.88}Co_{0.12}O_2$ as the current density increases to 0.2C and is maintained until the 35th cycle at different current densities. We calculated the capacity retention rates of the $LiNi_{0.88}Co_{0.12}O_2$ materials synthesized from coated and doped precursors at current density from 0.1C to 5C, which are 78% and 73%, respectively. This is consistent with our conclusion that the electrochemical property of the $LiNi_{0.88}Co_{0.12}O_2$ material from the coated precursor is the best. It can be attributed to the "barrier effect" of the coated $Co(OH)_2$ layer.

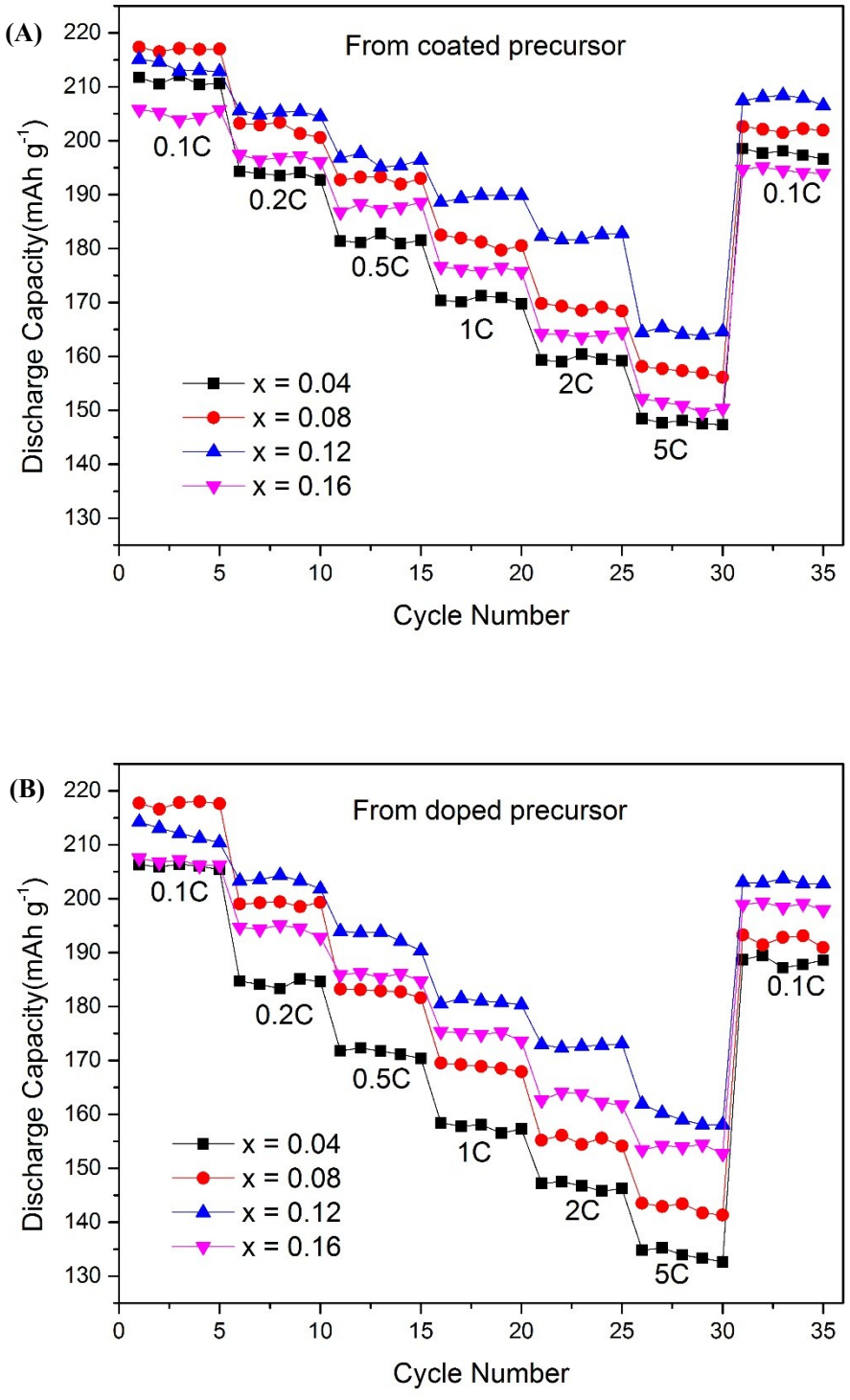

Fig. S1 Rate performances of the $LiNi_{1-x}Co_xO_2$ (x = 0.04, 0.08, 0.12, 0.16) materials synthesized from (A) coated and (B) doped precursors.